CRM RECOVERY

CRITICAL RAW MATERIAL CLOSED LOOP RECOVERY

LAYMAN'S REPORT

The LIFE 2014 CRM Recovery project aimed to demonstrate viable approaches to increase the recovery of target CRMs by 5% within the project lifetime (LIFE14 ENV/UK/000344)

CRM RECOVERY | CRITICAL RAW MATERIAL

The LIFE 2014 CRM Recovery project has received funding from the LIFE Programme of the European Union

Contents

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Project Reference	LIFE14 ENV/UK/000344
Duration	01-SEP-2015 to 29-MAR-2019
Total Budget	2,104,439.00 €
EU Contribution	1,262,662.00 €

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Introduction

The European Union's LIFE programme is a funding instrument for the environment and climate action. It has been running since 1992 and has co-funded more than 4600 projects across the EU and in developing countries. At any given moment some 1100 projects are in progress. The budget for 2014–2020 is set at €3.4 billion in current prices and covers a sub-programme for environment and a sub-programme for climate action. For the next long-term EU budget 2021-2027, the European Commission is proposing to increase funding by almost 60% for LIFE.

Coordinator

wrap

Supporters

Innovate UK

Llywodraeth Cymru
Welsh Government

Department
for Environment
Food & Rural Affairs

Project Partners

earn
European Advanced Recycling Network

Wuppertal
Institut

Innovate UK
Knowledge Transfer Network

European
Recycling
Platform

www.criticalrawmaterialrecovery.eu

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Foreword

Across Europe a significant amount of waste electrical and electronic equipment, otherwise known as WEEE, is thrown away, often ending up in landfill. In turn, critical raw materials, or CRMs, that are present within these unwanted products - such as gold, silver, platinum group metals and rare earth elements - are also wasted. This represents an unnecessarily high cost to the economy.

To demonstrate the scale of the problem, in the UK alone we landfill over 500,000 tonnes of WEEE every year, which includes a tonne of valuable gold.

In 2014, approximately 9.9 million tonnes of WEEE was generated in Europe. Eurostat reports that only around one third of WEEE generated is collected and recycled, this WEEE in turn has a CRM recovery rate of a mere 1%, these figures made it clear that action needed to be taken.

In 2015, the Critical Raw Material Closed Loop Recovery Project (CRM Recovery) was set up to address this problem. Led by WRAP, in partnership with EARN, ERP UK, KTN and the Wuppertal Institute, the team set out to increase the recovery of target CRMs from WEEE by 5% by 2020 and 20% by 2030, with the latter being worth €381m in gold, silver and platinum alone.

Carl Nichols
Head of WRAP Cymru

The first of its kind, the project went on to successfully link WEEE collection methods - such as retailer take-back schemes - to both product re-use and CRM recovery, by conducting and evaluating a series of trials in the UK, Italy, Germany, and the Czech Republic.

The findings have subsequently informed the development of five policy and infrastructure recommendations to optimise WEEE collections and maximise the recovery of CRMs; the details of which can be found within this report. It is exciting to consider the profound effect that they could have on the electronics industry and wider economy. Not just in Wales, where I lead WRAP's CRM Recovery team, which is part-funded by the Welsh Government, but right across the UK and Europe.

For both economic and environmental reasons, it is of paramount importance that we address the high risk associated with the supply of CRMs, which is of growing concern to businesses and governments. This project has provided important insights that will help to achieve this.

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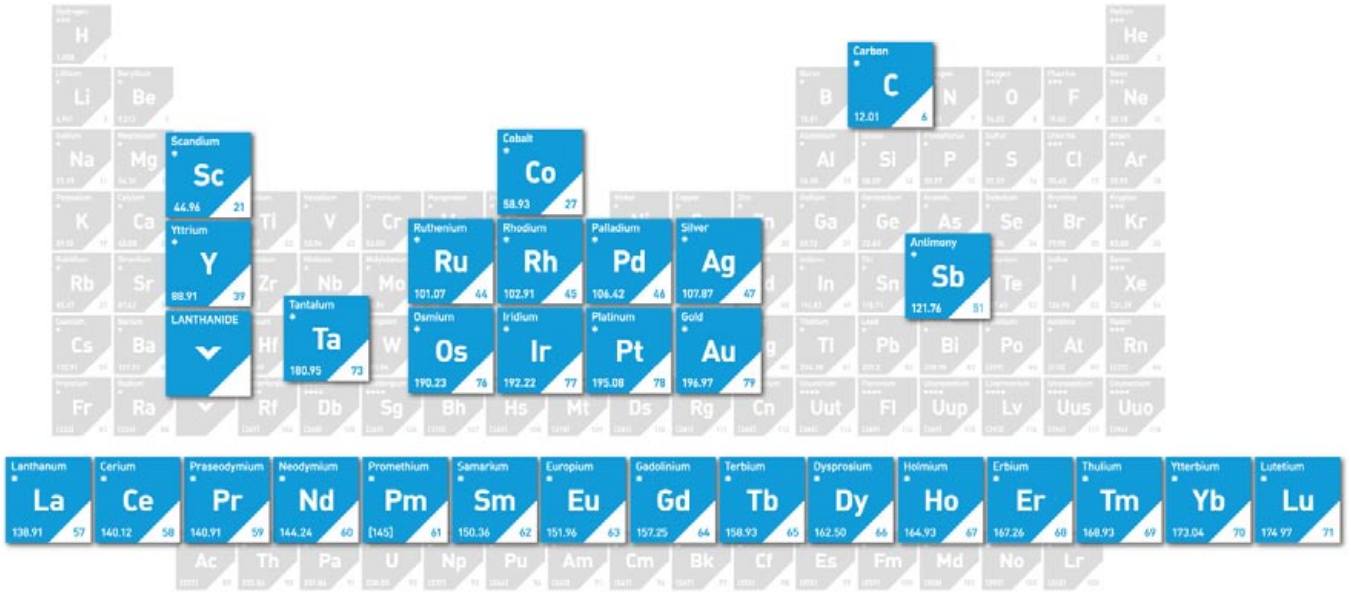
Why the Project was Needed

WHAT ARE CRMs?

Raw Materials classified by the European Commission as "Critical" due to their high economic importance to the EU combined with a high risk associated with their supply.



** figures taken from 2014 data.*

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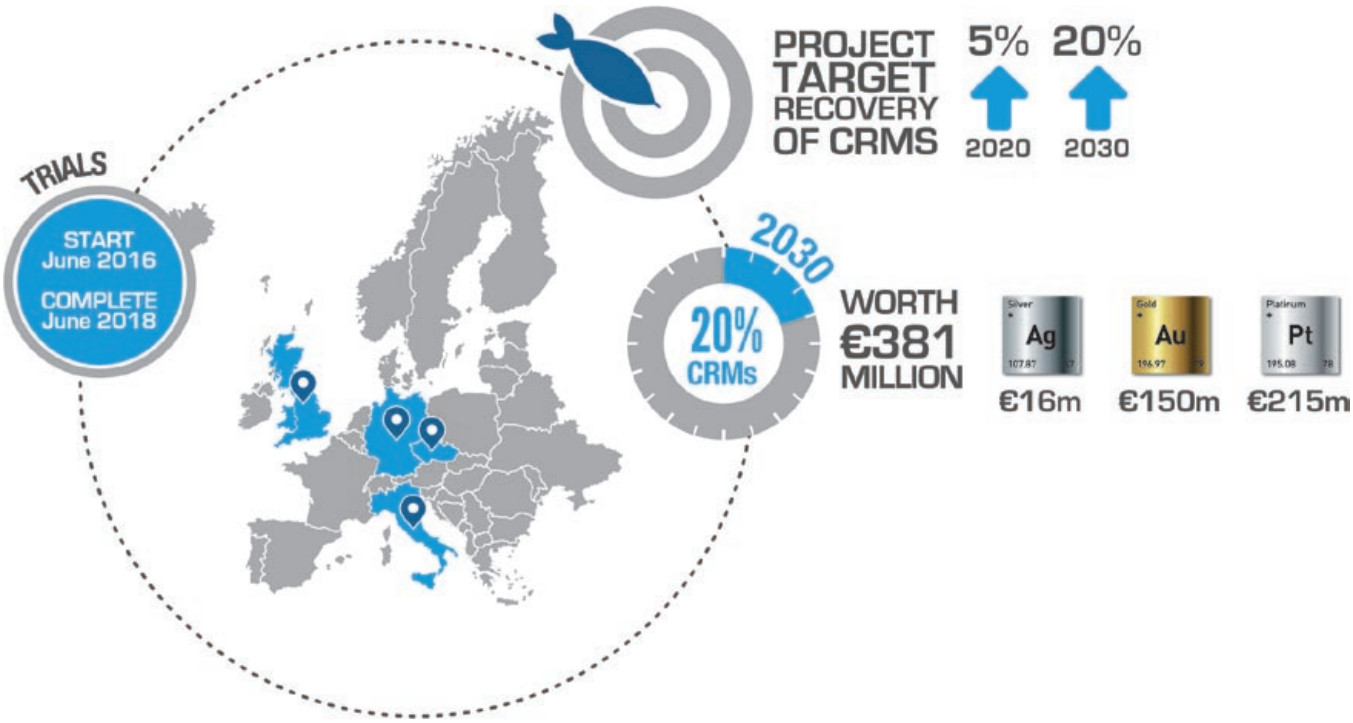
Why the Project was Needed



Integrating the Supply Chain for the Recovery of Critical Raw Materials from WEEE

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Project Outcomes

Achievements and Learnings

What We Learnt from Trials and Engaging with the Public

Knowledge of what to do is important

Having more information available about where to take WEEE encourages re-use and recycling.

Convenience is a factor

Using high street and charity retailers in particular was considered a very convenient way to dispose of WEEE.

Altruism is also a factor

Most trial participants agreed that disposing of their WEEE through take-back schemes was good for the environment.

Trust plays an important part in increasing WEEE collections

Consumers who participated in the collection trials had more trust in high street retailer brands than charities to handle their data securely.

Personal connection matters, increasing economic viability of collections

There is a link between the collection of high quality/high value products and human interaction at collection points. People are more likely to donate better-quality items if they can drop them at a collection point where they have personal interaction with an operative. Higher re-use rates are an important factor for the economic viability of keeping CRMs in the loop.

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Project Outcomes

Collection & Recovery Trials across the EU

Each year millions of tonnes of WEEE is generated in the EU, but only 30% is reported as properly collected and recycled. The Critical Raw Materials Closed Loop Recovery Project aimed to increase the recovery of target CRMs by 5% by 2020 and by 20% by 2030.

With this in mind, the project invested in trials exploring novel ways of boosting the collection and recovery of critical raw materials (CRMs) from household waste electrical and electronic equipment (WEEE).

Held across the UK, Italy, Germany and the Czech Republic, the collection trial mechanisms included retailer take-back schemes; re-use containers at household waste recycling centres, business collections, university drop-off hubs, school collections and other collection events.

A series of short, accessible case studies on best practice and guidance to demonstrate business benefits from increased raw material recovery are available on the website:
criticalrawmaterialrecovery.eu/casestudies

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Axion Consulting (UK)

- WEEE take-back in five Dixons Carphone stores and in partnership with a charity (British Heart Foundation).
- Incentivised WEEE take-back with John Lewis department stores.
- De-soldering of PCBs to extract CRM-rich components. Components were optically sorted and analysed.

Re-Tek (UK)

- Employees brought domestic WEEE to business WEEE collection points.
- WEEE bins located at recycling centres.
- WEEE collections at university halls of residence and within primary schools.
- Cobalt, gold and silver recovery by electrodeposition in an electrochemical flow system.

Ecodom (Italy)

- Consumer events held in public squares across Milan on Sundays.
- School collection hub in Milan.
- Static WEEE bins in 2 co-op stores.
- Extracting cobalt from Li-ion batteries.
- Comparing outputs from CRM-rich and non-CRM-rich WEEE through existing precious metal treatment facility.

RecyclingBörse (Germany)

- School collection hubs.
- Monthly kerbside household collections.
- Collection boxes for households and businesses.
- Production of Nd-Fe-B from magnets.
- Extraction of Tantalum from capacitors.

Asekol (Czech Republic)

- Mobile collection units in Prague.
- Increasing CRM concentration from WEEE reprocessing.

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Project Outcomes

Policy Recommendations

On International WEEE Day in October 2018, the project launched 5 key policy recommendations which built on learnings from project trials and activities, and discussion with the project's expert stakeholder group. The recommendations aim to increase the collection and recovery of CRMs from WEEE.

1. Redesign and harmonise WEEE collection infrastructure

By harmonising the collection infrastructure, confusion or incorrect disposal can be avoided, and consistent information and awareness raising activities can be undertaken, resulting in higher disposal and collection rates.

2. Increase awareness amongst citizens and businesses

Consumers and businesses can act as a driver, or barrier, for high quality CRM-rich WEEE reaching the recycling stream. Education and information sharing are paramount in ensuring policymakers, organisations and citizens are equipped with the knowledge of the potential supply risks and the associated impact.

3. Create incentives for collection and recycling organisations

If industry is not sufficiently supported or incentivised to trial new resource efficient business models that prioritise re-use or invest in CRM recovery facilities, these ventures may be seen as too high a risk. Likewise incentivised trade-in, for example, is a proven method to encourage citizens to donate high-quality CRM-rich electrical items in a good condition.

4. Continue innovation and research on CRM recovery and foster international collaboration

New material innovations in ever more complex electronic products happen in quick cycles, often out-pacing policy developments. Continuing support for research projects to keep up with technology and policy developments that specifically relate to CRMs would help to progress the recovery of CRMs from WEEE.

5. Introduce CRM-specific requirements into standards

Generic or weight-based collection and recycling targets for WEEE result in nations prioritising heavy items such as large domestic appliances (LDAs), which typically do not contain high concentrations of CRMs. Integrating critical raw materials and their recovery strategies into policies will provide an incentive for organisations to prioritise them.

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Looking Forward

Project activities and outcomes will continue to be disseminated into the foreseeable future, via online presence and presentations at international conferences.

Partners will continue to focus on businesses and organisations across Europe to stimulate action towards increasing the recovery of CRM-rich materials. They will aim to engage audiences not yet familiar with CRMs as well as those who have already started their collection and / or recovery journey.

CRM Recovery project communications tools are available to inspire other organisations and individuals to learn from the project findings.

More detail on the CRM Recovery project and its activities, outcomes and platforms can be found at the following links:

CRM Recovery website: http://www.criticalrawmaterialrecovery.eu

Linkedin site: https://www.linkedin.com/groups/8438910

Twitter: https://twitter.com/crmrecovery

Trial case studies: http://www.criticalrawmaterialrecovery.eu/home/casestudies

Policy Recommendations: http://www.criticalrawmaterialrecovery.eu/wp-content/uploads/2018/10/5-policy-recommendations-infographic.pdf

Project podcast: http://www.criticalrawmaterialrecovery.eu/wp-content/uploads/2019/01/A-Second-LIFE-for-Critical-Raw-Materials-Dif-without-background.mp4

Project outputs: http://www.criticalrawmaterialrecovery.eu/project-outputs

Project Partners

WRAP: http://www.wrap.org.uk

European Advanced Recycling Network (EARN): https://www.earn-service.com/en

European Recycling Platform (ERP): https://erp-recycling.org

Wuppertal Institute: https://wupperinst.org

Knowledge Transfer Network (KTN): https://www.ktn-uk.org

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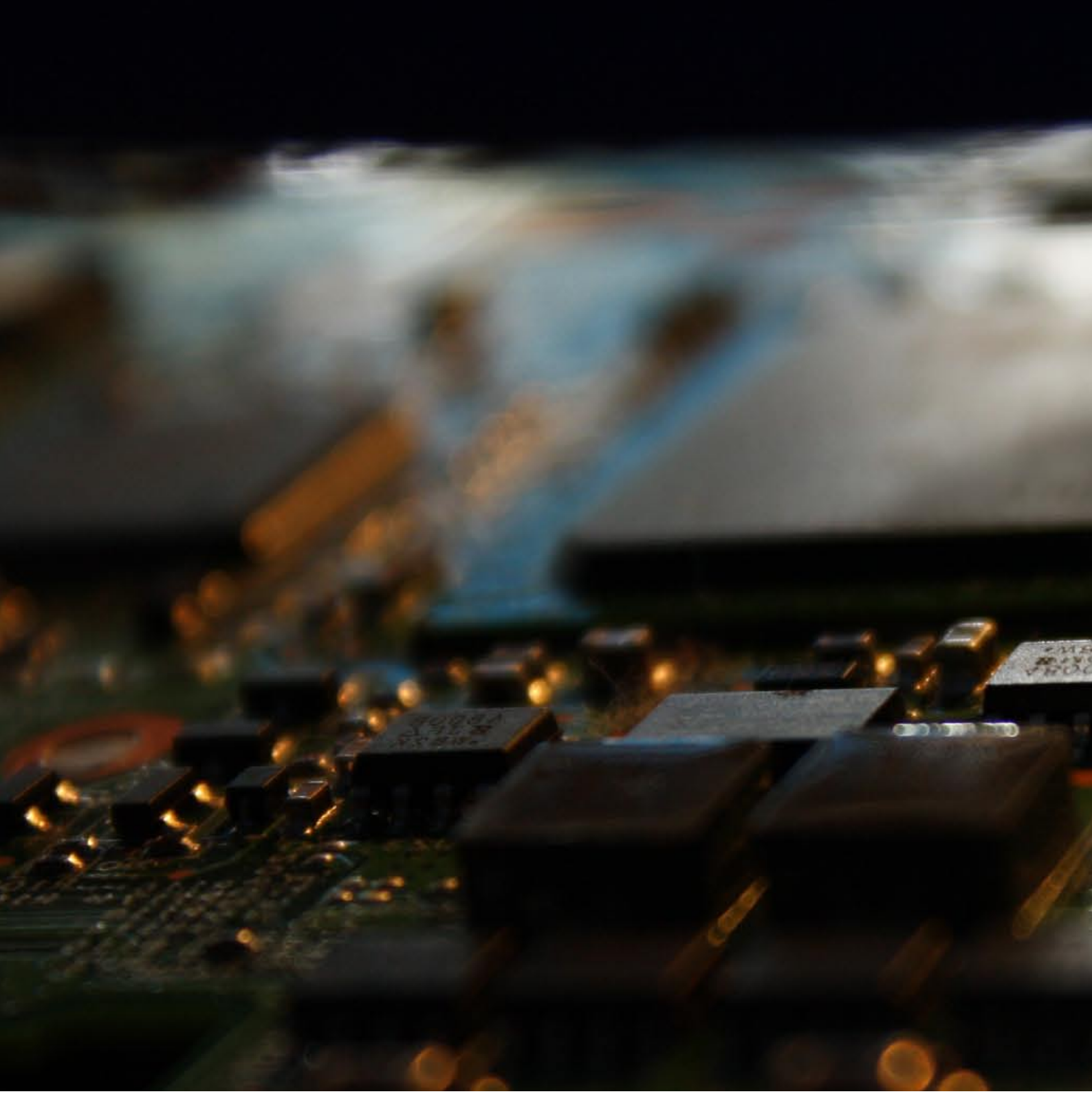

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